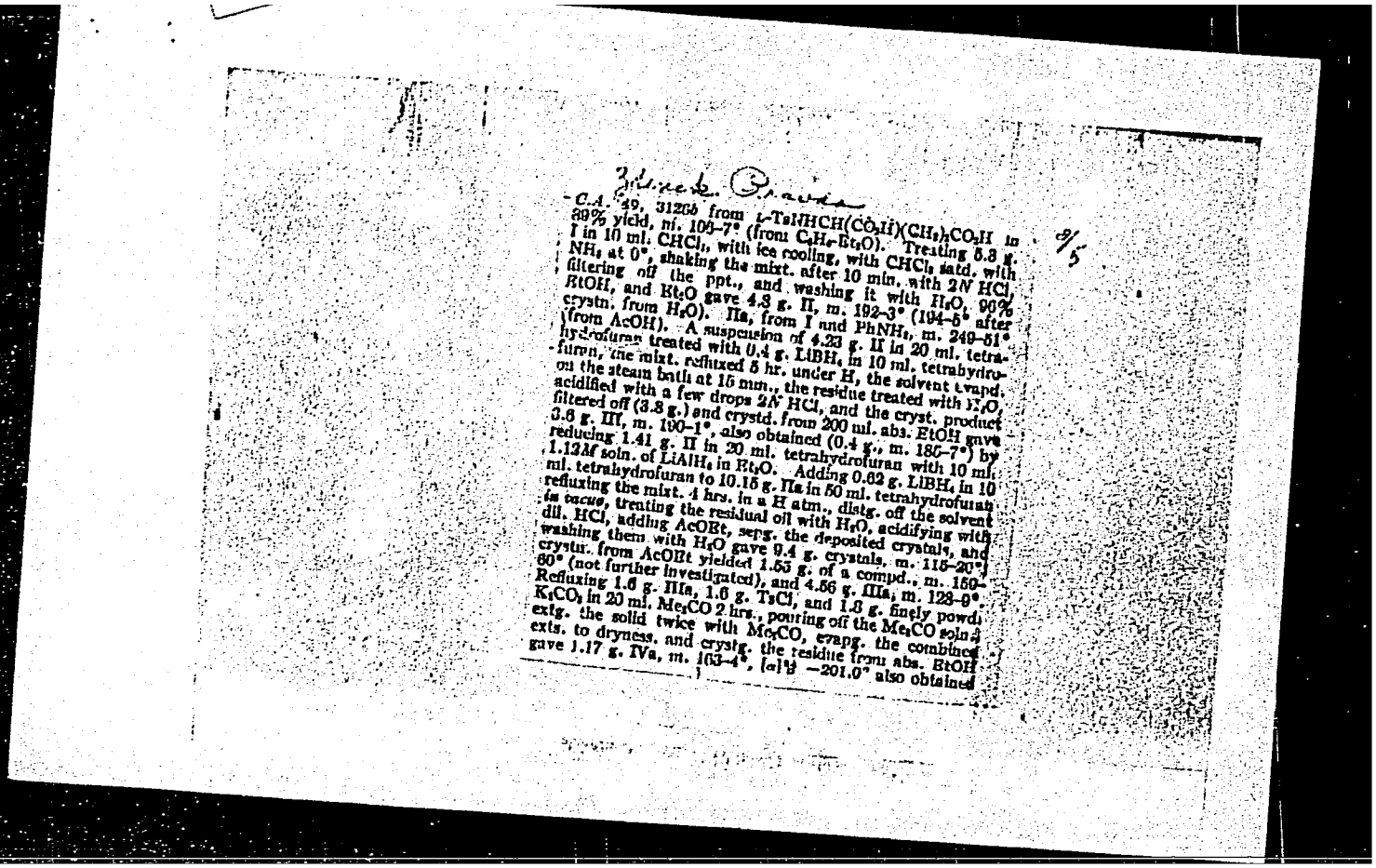

C.A. 49, 3126b from *p*-TsNHCH(CO$_2$H)(CH$_2$)$_2$CO$_2$H in 89% yield, m. 109–7° (from C$_6$H$_6$-Et$_2$O). Treating 5.3 g. I in 10 ml. CHCl$_3$ with ice cooling, with CHCl$_3$ satd. with NH$_3$ at 0°, shaking the mixt. after 10 min. with 2*N* HCl, filtering off the ppt., and washing it with H$_2$O, 90% EtOH, and Et$_2$O gave 4.3 g. II, m. 192–3° (194–5° after crystn. from H$_2$O). IIa, from I and PhNH$_2$, m. 249–51° (from AcOH). A suspension of 4.23 g. II in 20 ml. tetrahydrofuran treated with 0.4 g. LiBH$_4$ in 10 ml. tetrahydrofuran, the mixt. refluxed 5 hr. under H, the solvent evapd. on the steam bath at 15 mm., the residue treated with H$_2$O, acidified with a few drops 2*N* HCl, and the cryst. product filtered off (3.8 g.) and crystd. from 200 ml. abs. EtOH gave 3.6 g. III, m. 190–1°, also obtained (0.4 g., m. 186–7°) by reducing 1.41 g. II in 20 ml. tetrahydrofuran with 10 ml. 1.13*M* soln. of LiAlH$_4$ in Et$_2$O. Adding 0.62 g. LiBH$_4$ in 10 ml. tetrahydrofuran to 10.15 g. IIa in 50 ml. tetrahydrofuran refluxing the mixt. 4 hrs. in a H atm., distg. off the solvent *in vacuo*, treating the residual oil with H$_2$O, acidifying with dil. HCl, adding AcOEt, sepg. the deposited crystals, and washing them with H$_2$O gave 9.4 g. crystals, m. 115–20°; crystn. from AcOEt yielded 1.55 g. of a compd., m. 150–60° (not further investigated), and 4.56 g. IIIa, m. 128–9°. Refluxing 1.6 g. IIIa, 1.6 g. TsCl, and 1.8 g. finely powd. K$_2$CO$_3$ in 20 ml. Me$_2$CO 2 hrs., pouring off the Me$_2$CO soln., extg. the solid twice with Me$_2$CO, evapg. the combined exts. to dryness, and crystg. the residue from abs. EtOH gave 1.17 g. IVa, m. 163–4°, $[\alpha]_D^{25}$ −201.0° also obtained

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NH_3, addn. of 0.8 g. NH_4Cl, evapn. of the NH_3 at room temp., drying of the residue *in vacuo*, soln. in H_2O, acidification with HCl, extn. with Et_2O, and alkalinization at 0° gave 0.3 g. VIII, m. 76–7° (from Et_2O-petr. ether). Refluxing 0.76 g. VIII in 10 ml. 2*N* HCl 5 hrs., evapg. to dryness, dissolving the residue in H_2O, evapg. again to dryness, dissolving the residue in H_2O, filtering the soln. through Amberlite IR-4B, washing with 100 ml. H_2O, and evapg. the eluates yielded 0.32 g. VII, m. 224–6°, $[\alpha]_D^{25}$ −84.2° (from EtOH-Et_2O), also obtained by heating 0.54 g. monohydrate VI.H_2O and 5 ml. 36% HBr in AcOH 2 hrs. at 65°, evapg. the soln. at 15 mm., washing the oil 3 times with Et_2O, dissolving it in the min. amt. of H_2O, filtering through Amberlite (grain dimensions 1–2 mm.), washing with 100 ml. H_2O, evapg. to dryness, dissolving the residue in abs. EtOH and pptg. the product with Et_2O to give 0.15 g. (67%) VII, m. 226–8 (decompn.), $[\alpha]_D^{25}$ −84.6°. XIV. Constitution of phalloidine. 3. Bedřich Meloun and František Šorm (Czech. Akad. věd, Prague). *Chem. Listy* 48, 1670–6(1954); *Collection Czechoslov Chem. Communs* 20, 265–72(1955); cf. *C.A.* 49, 180d.—Hydrolysis of *phalloidine* (I) with a 30-fold amt. of 6*N* HCl 16 hrs. at 105° and paper chromatography of the hydrolyzate in *m*-cresol satd. with H_2O gave the following compds.: *alanine* (II) 26.7, *oxindolylalanine* (III) 22.5, *threonine* (IV) 13.1, *cysteine* (V) 14.6, and *alloxy-*

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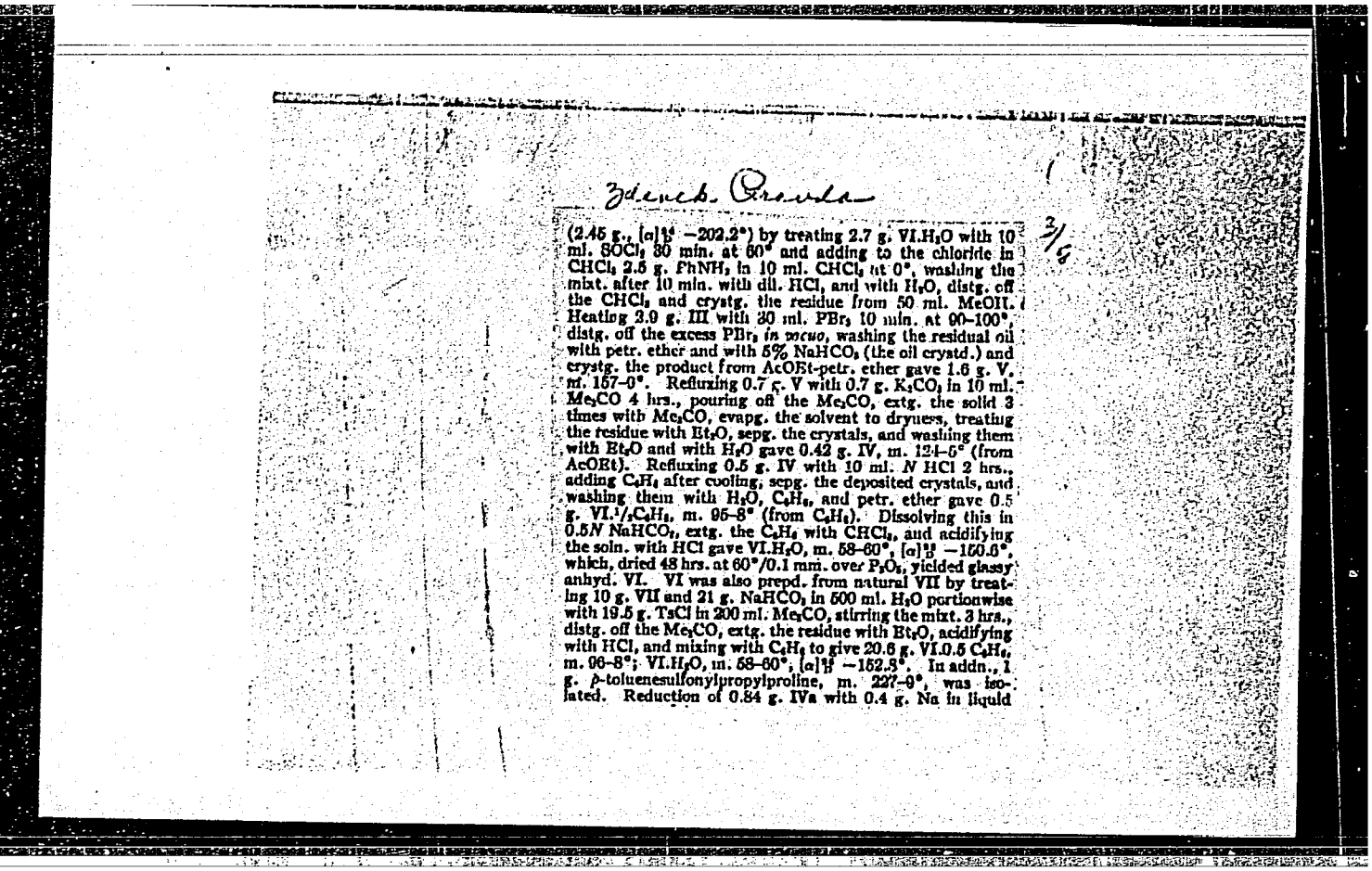

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(2.45 g., $[\alpha]_D^{25}$ −202.2°) by treating 2.7 g. VI.H_2O with 10 ml. $SOCl_2$ 30 min. at 60° and adding to the chloride in $CHCl_3$ 2.5 g. $PhNH_2$ in 10 ml. $CHCl_3$ at 0°, washing the mixt. after 10 min. with dil. HCl, and with H_2O, distg. off the $CHCl_3$ and crystg. the residue from 50 ml. MeOH. Heating 3.0 g. III with 30 ml. PBr_3 10 min. at 90–100°, distg. off the excess PBr_3 *in vacuo*, washing the residual oil with petr. ether and with 5% $NaHCO_3$ (the oil crystd.) and crystg. the product from AcOEt-petr. ether gave 1.6 g. V, m. 157–9°. Refluxing 0.7 g. V with 0.7 g. K_2CO_3 in 10 ml. Me_2CO 4 hrs., pouring off the Me_2CO, extg. the solid 3 times with Me_2CO, evapg. the solvent to dryness, treating the residue with Et_2O, sepg. the crystals, and washing them with Et_2O and with H_2O gave 0.42 g. IV, m. 124–5° (from AcOEt). Refluxing 0.5 g. IV with 10 ml. *N* HCl 2 hrs., adding C_6H_6 after cooling, sepg. the deposited crystals, and washing them with H_2O, C_6H_6, and petr. ether gave 0.5 g. VI.½C_6H_6, m. 95–8° (from C_6H_6). Dissolving this in 0.5*N* $NaHCO_3$, extg. the C_6H_6 with $CHCl_3$, and acidifying the soln. with HCl gave VI.H_2O, m. 58–60°, $[\alpha]_D^{25}$ −160.6°, which, dried 48 hrs. at 60°/0.1 mm. over P_2O_5, yielded glassy anhyd. VI. VI was also prepd. from natural VII by treating 10 g. VII and 21 g. $NaHCO_3$ in 500 ml. H_2O portionwise with 19.5 g. TsCl in 200 ml. Me_2CO, stirring the mixt. 3 hrs., distg. off the Me_2CO, extg. the residue with Et_2O, acidifying with HCl, and mixing with C_6H_6 to give 20.6 g. VI.0.5 C_6H_6, m. 96–8°; VI.H_2O, m. 58–60°, $[\alpha]_D^{25}$ −162.8°. In addn., 1 g. *p*-toluenesulfonylpropylproline, m. 227–9°, was isolated. Reduction of 0.84 g. IVa with 0.4 g. Na in liquid

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drozyproline (VI) 20.1%. Desulfuration of 44.9 mg. I in 10 ml. H_2O by shaking 24 hrs. at room temp. with 1 g. Raney Ni W 6, removal of the Ni, washing with 15 ml. H_2O, and frost sublimation gave 16.56 g. *dethiophalloidine* (VII), further amts. being obtained by treatment with 10% C_5H_5N and frost sublimation for a total yield of 35.5 mg. (79%) VII. The product consisted of 2 compds. having R_f 0.45 and 0.52, resp. (in AcEt:Me_2CO:H_2O 20:2:5). Chromatography of crude VII over a cellulose column with the above mixt. gave 19.8 g. pure VII contg. no III, showing absorption max. at 280 and 288 mμ, and contg. 0.63 mole *tryptophan* (VIII)/mole VII. Hydrogenation of 17 mg. VII in 5 ml. H_2O over 30 mg. PtO_2 in the presence of 0.1 ml. 6*N* HCl gave, after 36 hrs., 13 mg. incompletely hydrogenated product contg. *dethiohydrophalloidine* (VIIa). The hydrolyzate of VIIa contained H 37.6, IV 17.2, VI 15.7%, and no hexahydrooxindolylalanine (IIIa). The content of octahydrotryptophan (VIIIa) was not detd. As reference prepns. IIIa and VIIIa, m. 238, were prepd. by hydrogenation of III and VIII over PtO_2 in aq. HCl. IIIa *picrolonate*, m. 204° (from aq. EtOH). On the basis of the expts., it follows that I contains only 1 mole of an amino acid having an indole ring and being bound as 2-mercaptotrypophan. The following formulas for the hexapeptide are suggested (where A = cysteine, B = alanine, C = hydroxyproline, D = tryptophan, E = threonine): S.A.B.C.D.B.E., S.A.E.D.B.C.B.

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Amino acids and peptides. XVI. Peptides of DL-α,β-diaminopropionic acid. Karel Poduška, Josef Rudinger, and František Šorm (Czech. Akad. věd, Prague). *Chem. Listy* 49, 737–44; *Collection Czechoslav. Chem. Communs.* 20, 1174–82(1955)(in English); cf. *C.A.* 50, 1503e.—Prepns. of DL-α,β-*diaminopropionamide* (I), DL-α,β-*diaminopropionylglycine* (II), DL-α,β-*diaminopropionylglycinamide* (III), *Nα-glycyl*-DL-α,β-*diaminopropionic acid* (IV), *Nβ-glycyl*-DL-α,β-*diaminopropionic acid* (V), *bis-glycyl*-DL-α,β-*diaminopropionic acid* (VI), and of the derivs. are described. Heating 40 g. $BrCH_2CHBrCO_2H$ with 400 ml. aq. NH_4OH satd. at 0° 3–4 hrs. at 100° in an autoclave, distg. off the NH_3 *in vacuo* under N, dissolving the residue in a min. amt. of H_2O, and treating the soln. with activated C, and filtering gave 14.5–17.5 g. DL-$H_2NCH_2CH(NH_2)CO_2H$, decompg. 230–2°. *Nβ-carbobenzyloxy*-DL-α,β-*diaminopropionic acid*, decompg. 234–5°, yield 15%. *Nα-benzoyl-Nβ-carbobenzyloxy*-DL-α,β-*diaminopropionic acid* m. 150–1°. Treating 5.4 g. dicarbobenzoxy-DL-α,β-diaminopropionic acid (VII) in 60 ml. dry $CHCl_3$ at 0° with 3.8 g. PCl_5 until the PCl_5 dissolved, evapg. the mixt. *in vacuo* at 40°, and extg. the residue with petr. ether gave 3.54 g. DL-*4-(carbobenzyloxyaminomethyl)oxazolidine-2,5-dione* (VIII), decompg. 139–40° (from AcOEt-petr. ether). Shaking 1.61 g. VIII at 20° with 30 ml. abs. MeOH contg. 10 millimoles HCl, letting stand 12 hrs., distg. off the MeOH, and crystg. the residue from MeOH-Et_2O mixt. gave 1.60 g. of the *HCl salt* of *Me Nβ-carbobenzyloxy*-DL-α,β-*diaminopropionate*, m. 137–8°. In the same way was prepd. 85% *HCl salt* of *Et Nβ-carbobenzyloxy*-DL-α,β-*diaminopropionate* (IX), m. 143–4.5°. Treating 1.12 g. VII with 20 ml. *N* HCl in EtOH overnight gave 1.1 g. *Et dicarbobenzyloxy*-DL-α,β-*diaminopropionate*, m. 89–91° (from AcOEt-petr. ether); *amide*, by treatment with MeOH satd. with NH_3, in 81% yield, m. 172–3° (from 30% AcOH). Hydrolysis of the amide (0.73 g.) with 10 ml. 37% HBr in AcOH (20 min. at 20° and 20 min. at 40°) and diln. with Et_2O gave after 1 hr. at 0° 0.51 g. *di-HBr salt* of I, decompg. 243°. The *Et ester* (IXa) of *di(carbobenzyloxy)*-DL-α,β-*diaminopropionylglycine* (X) was prepd. in 2 ways: Refluxing 1.97 g. VII in 10 ml. PhMe 2 hrs. with 0.72 g. $OCNCH_2CO_2Et$, distg. off the solvent *in vacuo*, triturating the residue with satd. soln. of $NaHCO_3$, and washing the crystals with H_2O, *N* HCl and H_2O gave 2.2 g. IXa, m. 141–1.5° (from 80% EtOH). Treating 3 g. VII in 20 ml. $CHCl_3$ at 5° with 0.93 g. 1-$EtC_5H_{10}N$ and 1.12 *sec*-BuO_2CCl, adding a cool (−5°) soln. of 0.87 g. $H_2NCH_2CO_2Et$ in 10 ml. $CHCl_3$, letting the mixt. stand 2 hrs. at −5° and 12 hrs. at room temp., evapg. the solvent, and treating the residue with $NaHCO_3$ gave 84% IXa. IXa (3.33 g.), 8 ml. *N* NaOH, 5 ml. MeOH, and 10 ml. dioxane shaken 1.5 hrs., acidified to Congo red with dil. HCl, and the cryst. residue (2.91 g.) repptd. from $NaHCO_3$ gave 1.6 g. X, m. 170–1°. X was treated with HBr in AcOH, the base liberated by means of an ion exchanger, and treated with picric acid to give *picrate* of II, m. 210° (from H_2O). Satg. 1.5 g. of the Et ester of X in 30 ml. MeOH with NH_3 at 0°, keeping the

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mixt. overnight, distg. off the MeOH, and repeating the procedure with the residue gave 1.18 g. of the *amide* of X, m. 178-9.5° (from aq. EtOH). Treatment of 0.8 g. of this compd. with HBr in AcOH, with Amberlite, and with picric acid gave 0.75 g. of the *dipicrate* of III, m. 190–1° (from aq. EtOH). IX (from 2.12 g. IX.HCl and NH_3 in $CHCl_3$) treated with 1.64 g. $PhCH_2O_2CNHCH_2CON_3$ gave *Et ester* of *Nβ-carbobenzyloxy-Nα-carbobenzyloxyglycyl-*DL-*α,β-diaminopropionic acid* (XI) as a gel; the Me ester was prepd. similarly. Sapon. of the Et or Me ester of XI by keeping 1.5 hrs. with *N* alc. NaOH gave 1.58 g. free XI, m. 120–2°. Treatment of XI with HBr in AcOH, filtering the soln. through Amberlite, evapg. the soln. to 10 ml., and adding to 4 ml. 0.23 g. picric acid in 3 ml. EtOH pptd. 0.3 g. of the *picrate* of IV, decompg. 208° (from H_2O). Dissolving 24 g. of the HBr salt of $H_2NCH_2CH(NH_2)CO_2H$ in 130 ml. 2*N* NaOH, cooling the soln. to 0°, and treating during 35 min. with 35 g. tosylglycine chloride in Et_2O and with 300 ml. *N* NaOH, stirring the mixt. 35 min. at 0°, sepg. the aq. layer, extg. it twice with Et_2O, acidifying with HCl to Congo red, repptg. the sepd. crystals 3 times, and crystg. the product from dil. AcOH gave 7.12 g. *dihydrate* of *Nα,Nβ-bis-(tosylglycyl)-*DL-*α,β-diaminopropionic acid* (XII), m. 80–2°. Adjusting the pH of the mother liquors to 7 and letting the soln. stand several hrs. at 0° gave 10.57 g., and by evapg. an addnl. 1.84 g. *Nβ-tosylglycyl-*DL-*α,β-diaminopropionic acid* (XIII), decompg. 202°. Heating 2.77 g. XIII, 2.6 g. PhOH, and 44 ml. 37% HBr in AcOH 2 hrs. at 70° in a pressure bottle, cooling the mixt., pouring it into 150 ml. Et_2O, allowing to stand 2 hrs. in the icebox, washing the crystals several times with Et_2O, dissolving them in H_2O, removing the Br ions with Amberlite in an acetate cycle, evapg. the filtrate *in vacuo*, and treating the residue with 30 ml. EtOH contg. 15 millimoles HCl pptd. an oil which crystd. on trituration at 50°. Dissolving the HCl salt in a min. amt. of H_2O, treating the soln. with 20 ml. EtOH contg. 5 millimoles HCl, and adding Et_2O pptd. 1.45 g. of the *HCl salt of* V, decompg. 210°. The same product was obtained from XIII in 48% yield by reduction with Na in NH_3. Heating 0.53 g. XII (dried *in vacuo* over P_2O_5), 0.6 g. PhOH, and 10 ml. 30% HBr in AcOH 4 hrs. at 65°, and working up the mixt. as described above yielded 87% of the amino acid and, after adding picric acid, 76% of the *picrate* of VI, m. 204–5° (decompn.) (from H_2O). Adding at 0° 1 g. tosylglycine chloride in Et_2O soln. to 0.91 g. HCl of the salt of *Et Nβ-carbobenzyloxydiaminopropionate* in 6 ml. *N* NaOH, shaking the mixt. 1.5 hrs. at 0°, sepg. the aq. layer, extg. it twice with Et_2O, and acidifying with HCl gave an oil which crystd. in the icebox. Repptn. and recrystn. gave 0.29 g. *Nβ-carbobenzyloxy-Nα-tosyloxy-*DL-*α,β-diaminopropionic acid*, m. 161-3°. Shaking 0.95 g. XIII, 0.68 g. $PhCH_2O_2CCl$, and 10 ml. *N* NaOH 2 hrs. at 0°, extg. the soln. twice with Et_2O, and acidifying it with HCl gave an oil which crystd.; after repptn. and recrystn. from aq. EtOH, it m. 155-6° (yield 0.2 g.).

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CZECHOSLOVAKIA/Organic Chemistry - Naturally Occuring Substnaces and Their Synthetic Analogs

Abs Jour : Referat Zhur - Khimiya, No 2, 1957, 4571

Author : Zaoral Milan, Rudinger Josef
Title : Amino Acids and Peptides. XVII. Syntheses Pertaining to Oxytocine. I. New Synthesis of the Amide of S-Benzyl-L-Cysteinyl-L-Prolyl-L- Leucylglycine.

Orig Pub : Chem. listy, 1955, 49, No 5, 745-750

Abstract : For a total synthesis of oxytocine a method has been worked out for the preparation of the amide of S-benzyl-L-cysteinyl-L-prolyl-L-leucylglycine and some derivatives of L-prolyl-L-leucine and L-prolyl-L-leucylglycine. The procedure is simpler than that which has been described before (see RZhKhim, 1955, 18883). The authors started with the ethyl ester of carbobenzoxy-L-leucylglycine (I), which was prepared from mixed anhydride (2 g carbobenzoxy-L-leucine, 1.1 g $ClCOCC_4H_9$-secondary

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(II), 0.86 g N-ethyl poperidine (III) in 5 ml $CHCl_3$, -5°) and ethyl ester of glycine (0.8 g) in $CHCl_3$ (10 minutes at -5°, 30 minutes ~20°).
The solution in ethyl acetate was purified by extraction with HCl (acid) and $NaHCO_3$, yield 86%, MP 105-106 (from ethyl acetate-petroleum ether). Ethyl ester of carbobenzoxy-L-prolyl-L-leucylglycine (IV) was prepared by two procedures: a) from I and 37% solution of HBr in glacial CH_3COOH -- hydrobromide, NH_3 in $CHCl_3$ -- ethyl ester of

L-leucylglycine, the latter mixed with mixed anhydride (from 14.2 g crystalline carbobenzoxy-L-proline (see RZhKhim, 1955, 18880), 7.8 g II, 6.5 g III), same as before, yield 79%, MP 150-151° (from ethyl acetate-ether); b) from N-carboxyanhydride of L-leucine (850 mg in 5 ml ethyl acetate) and ethyl ester of glycine (570 mg in 5 ml

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(680 mg in 5 ml chloroform) and mixed anhydride (800 mg, N-carbobenzoxy-S-benzylcystein (VIII), 320 mg II, 270 mg III, 2 hours stirring), yield 80%, MP 170-171° (alcohol-water); b) from hydrobromide of VI (1 g in 5 ml chloroform) with 1 equivalent III and mixed anhydride (730 mg VIII, 370 mg II, 310 mg III), as under (a), yield 71%, MP 170-171°. Amide of S-benzyl-L-cysteinyl-L-prolyl-L-leucylglycine from VII (800 mg) and 15% solution HBr in glacial CH_3COOH (3 ml) 10 minutes, 60°. Product precipitated with ether and HBr removed with Ag_2CO_3 (stirring 3 hours), Ag^+ removed with H_2S, yield 75.5%, not crystalline, slightly hygroscopic, R 0.73 (butanol-water-CH_3COOH). Hydrobromide, decomposition point 125° (alcohol-ether). Picrate-sesquihydrate, decomposition point 105°. Ethyl ester of carbobenzoxy-L-prolyl-L-leucine (IX) from mixed anhydride

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Synthesis in the field of oxytocin II. Synthesis of some derivatives of L-cysteinyl-I-tyrcsylglycine L-cysteinyl-L-tyrosyi-L-leucine and L-cysteinyl-L-tyrosyl-L-isoleucine, p. 751.

CHEMICKE LISTY (Ceskoslovenska akademic ved. Ceskaslovenska spotlcnost chemicks) Praha, Czechoslovakia, Vol. 49, no. 5, May 1955.

Monthly List of East European Accessions (EEAI), LC, Vol. 9, no. 1, Jan 1960.

Uncla.

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Syntheses in the oxytocin field. III. An alternative [illegible]sis of oxytocin. Josef Rudinger, Jan Honzl, and [illegible] (Prague). Chem. Listy [illegible] Tosyl-S-benzyl-L-[illegible] [illegible]asparaginyl-[illegible] [illegible]amide (I) [illegible] coupling in HCONMe₂ [illegible] [illegible]carbobenzoxy-L-glutaminyl-L-asparaginyl-S-benzyl-L-[illegible] cysteinyl-L-prolyl-L-leucylglycinamide (II) with tosyl-S-benzyl-[illegible] isoleucyl azide, prepd. by treating [illegible] hydrazide with 1.6% $NaNO_2$ in a mixt. of AcOH [illegible] 12°. Reduction of I with Na in liquid [illegible] oxidation with air yielded a product show-[illegible] activity. A series of peptides was [illegible] follows. II was prepd. (1) by treating a soln. [illegible] S-benzyl-L-cysteinyl-L-prolyl-L-leucylglycinamide (III) and 0.3 g. carbobenzoxy-L-glutaminyl-L-asparagine (IV) in $HCONMe_2$ with 0.35 ml. $[(EtO)_2P(O)]_2O$ at 18-24° for 6 days yielding 0.22 g. cryst. II, m. 209-10° (from aq. MeOH); (2) by adding to a soln. of 0.12 g. carbobenzoxy-L-glutaminyl-L-asparaginyl-S-benzyl-L-cysteine (V) in $HCONMe_2$ at −10° 0.28 ml. 10% soln. of N-ethylpiperidine in toluene, 0.28 ml. 10% soln. of $ClCO_2CHMeEt$ in toluene, and 0.07 g. L-prolyl-L-leucylglycinamide-HBr (VI) in toluene and heating the mixt. to 100°, yielding 70 mg. II. For prepn. of III and VI cf. Z. and R. (C.A. 50, 4017d). IV was obtained by treating aq. soln. of 1.5 g. L-glutaminyl-L-asparagine (cf. C.A. 49, 3127b) with 1.1 ml. carbobenzoxy [illegible], extg. with Et_2O and pptg. from water with EtOH, [illegible] 1.5 g. IV, m. 206°. V was prepd. (1) by adding 30% [illegible] HBr in AcOH to 650 mg. carbobenzoxy-L-asparaginyl-S-benzyl-L-cysteine (cf. Boissonnas, et al., C.A. 50, [illegible]) and treating the resulting hydrobromide with a soln. [illegible] mixed anhydride prepd. from 400 mg. carbobenzoxy-L-glutamine yielding 250 mg. V, m. 215-17°; or (2) by alk.

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hydrolysis of *Me ester* of *carbobenzoxy-L-glutaminyl-L-asparaginyl-S-benzyl-L-cysteine* (VII) in 80% aq. tetrahydrofuran yielding 75% V. VII was obtained by the anhydride method (cf. Vaughan, *C.A.* 49, 862*f*) on treating a soln. of 1.2 g. IV in $HCONMe_2$ with 0.67 g. Me ester of *S*-benzyl-L-cysteine at 100° which gave 0.85 g. VII, m. 230–7° (from aq. MeOH). *Me ester* of *carbobenzoxy-L-asparaginyl-S-benzyl-L-cysteine* (VIII) was obtained (*1*) by the anhydride method on treating 1.3 g. carbobenzoxy-L-asparagine (IX) with 1.1 g. Me ester of *S*-benzyl-L-cysteine (X) in dioxane, yielding 1.2 g. VIII, m. 194–5° (from MeOH-AcOH) or (*2*) by the phosphorazo method by adding to 3.1 g. X in dry pyridine, 0.8 g. PCl_3 and 2.4 g. IX and heating at 60° 2 hrs., yielding 2.4 g. VIII. *L-Glutaminyl-L-asparaginyl-S-benzyl-L-cysteinyl-L-prolyl-L-leucylglycinamide* (XI) was prepd. by pouring 6 ml. 33% HBr in AcOH on 1.2 g. II, pptg. the HBr salt with dry Et_2O followed by treatment with Amberlite IRA-400 yielding 800 mg. XI, m. 135°. The *Me ester* of *tosyl-S-benzyl-L-cysteinyl-L-tyrosyl-L-isoleucine* (XII) was prepd. by dropping into a soln. of 0.9 g. tosyl-*S*-benzyl-L-cysteinyl-L-tyrosine in a mixt. of AcOH-6*N* HCl-H_2O (9:1:0.8) an aq. soln. of 0.14 g. $NaNO_2$ at −12°, extg. the azide with Et_2O and treating the ext. with a soln. of 0.31 g. freshly distd. Me ester of L-isoleucine in EtOAc. Yields were 0.83 g. XII, m. 193–4° (from aq. MeOH). Tosylpyrrolidonecarboxylic acid chloride, prepd. by treating 15 g. tosylglutamic acid with $SOCl_2$, was added in $CHCl_3$ soln. to 7.5 g. L-asparagine in 50 ml. *N* NaOH under cooling, the mixt. was acidified, extd. with Et_2O, the ext. was dried, ground with EtOH, heated to 50° and cooled to 0°, yielding 11.4 g. *N-tosyl-L-pyrrolid-5-on-2-carbonyl-L-asparagine* (XIII), m. 150–1° (from 75% EtOH, EtOH solvate). XIII from acetonitrile m. 155–6°, from dioxane m. 158–60°, from water or dild. aq. solvents m. 150–2°. The Et ester of *N-tosyl-L-pyrrolid-5-on-2-carbonyl-L-asparaginyl-S-benzyl-L-cysteine* (XIV) was obtained (*1*) by the anhydride synthesis from 2.85

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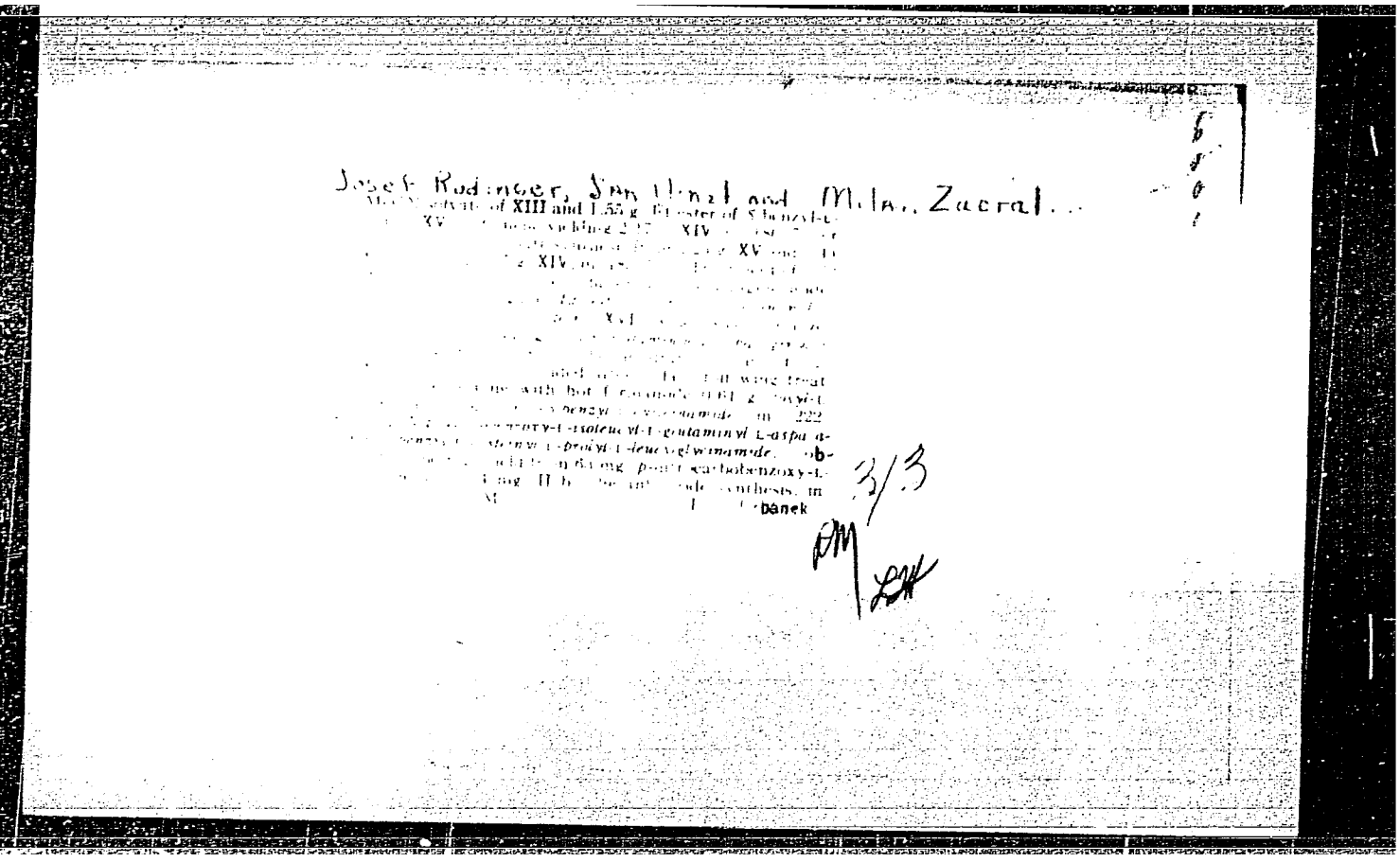

Josef Rudinger, Jan Ilavský and Milan Zaoral

Dánek

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Rudinger, J.

Syntheses in the oxytocin field. IV. Two analogs. Preliminary communication. J. Rudinger, J. Honzl, and M. Zaoral (Čsl. akad. věd, Prague). *Chem. Listy* 50, 825–6 (1956); *Collection Czechoslov. Chem. Communs.* 21, 770 (1956); *C.A.* 50, 12826a.—By means of the azide synthesis, *tosyl-S-benzyl-L-cysteinyl-L-tyrosyl-L-leucyl-L-glutaminyl-L-asparaginyl-S-benzyl-L-cysteinyl-L-prolyl-L-leucylglycinamide*, m. 242–5°, was prepd. from tosyl-*S*-benzyl-L-cysteinyl-L-tyrosyl-L-leucine hydrazide and L-glutamyl-L-asparaginyl-*S*-benzyl-L-cysteinyl-L-prolyl-L-leucylglycinamide (I). Similarly was prepd. *tosyl-S-benzyl-L-cysteinyl-L-tyrosyl-L-valyl-L-glutaminyl-L-asparaginyl-S-benzyl-L-cysteinyl-L-prolyl-L-leucylglycinamide*, m. 220–6°, from I and *tosyl-S-benzyl-L-cysteinyl-L-tyrosyl-L-valine hydrazide*, m. 243–5°, which was in turn obtained from the corresponding Me ester, m. 208–10°. Reduction with Na in NzI, of the 2 tosyl derivs. of the nonapeptide gave 2 analogs of oxytocin (II), one (III) having leucine, the other (IV) valine in place of the isoleucine of II. Both prepns. had the effect upon rat uterus, pressoric effect with cocks, and lactation effect of the same order as II, antidiuretic action of IV was the same as that of III but 1 order higher than that of II.

M. Hudlický

RUDINGER, JOSEF

CZECHOSLOVAKIA/Organic Chemistry - Naturally Occuring Substances and Their Synthetic Analogs E-3

Abs Jour : Referat Zhur - Khimiya, No 2, 1957, 4572

Author : Honzl Jan, Rudinger Josef
Title : Amino Acids and Peptides. XVIII. Syntheses Pertaining to Oxytocine II. Syntheses of Some Derivatives of L-Cysteinyl-L-Tyrosylglycine, L-Cysteinyl-L-Tyrosyl-L-Leucine and L-Cysteinyl-L-Tyrosyl-L-Isoleucine.

Orig Pub :

Abstract : Syntheses of some peptide derivatives (stated in the title). The tosyl group was used to protect the amino group, which resulted in the preparation of derivatives that exhibit good crystallization. The authors started with tosyl-S-benzylcystein (I), which they obtained from 21 g of S-benzylcystein in 75 ml 2N NaOH and 20 g $p\text{-}CH_3C_6H_4SO_2Cl$ in 60 ml acetone together with 23 ml 4N NaOH (stirring 1 hour); on acidification

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Ethyl ester of tosyl-S-benzyl-L-tyrosylglycine (VI). To 0.8 g V in admixture with 3 ml 1N HCl, 5 ml glacial CH_3COOH and 14 ml ether (-18°) added 0.102 g $NaNO_2$ in 1 ml water, stirred (1 minute), added 60 ml 28.5% NaCl and ether, stirred (30 seconds), aqueous layer separated, ether washed twice with solution of NaCl (all at -18° within 7 minutes); azide in ether added to 0.17 g ethyl ether of glycerol in 3 ml $CH_3COOC_2H_5$ (within 12 hours at 0° the oil crystallizes), washed with HCl, water and 5% solution of $NaHCO_3$, yield 69%, MP 134.5° (from benzene-aqueous alcohol). L-4-(p-acetoxybenzyl)-oxazolyldione-2,5-(N-cartoxyanhydride of O-acetyl-L-tyrosine): into 2.5 g hydrochloride of O-acetyl-L-tyrosine in tetrahydrofurane is passed phosgene (40-45°, 3.5 hours), then for 2 hours dry air. Residue on evaporation dissolved in ether, at

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Abs Jour : Referat Zhur - Khimiya, No 2, 1957, 4572

at 0° -- crystals, yield 83%, MP 118-120° ($CH_3COOC_2H_5$-petroleum ether). Ethyl ester of tosyl-S-benzyl-L-cysteinyl-(O-acetyl-L-tyrosyl)-glycine (VII) from the preceding compound (0.5 g in 10 ml $CH_3COOC_2H_5$), from ethyl ester of glycine (0.2 g, distilled) and N-ethylpiperidine (0.8 ml in 20 ml $CH_3COOC_2H_5$, 1 hour at -6°, then gradually ~ 20°), then added II (0.7 g in 10 ml $CH_3COOC_2H_5$ at 15°), mixture heated gradually, washed with HCl, water and 5% solution $NaHCO_3$, yield 31%, MP 154-155° (from $CH_3COOC_2H_5$-petroleum ether). Tosyl-S-benzyl-L-cysteinyl-L-tyrosyl-glycine (VIII): a) from VI (0.2 g) and 4N NaOH (0.4 ml), ~ 20°, 45 minutes, on acidification there is obtained the hydrate, yield 54%, MP 125°; b) from VII in a somilar manner, yield 50%. Hydrazide of VIII (IX): a) from VI (0.3 g) and 80% solution $N_2H_4.H_2O$ (0.03 ml) as in the case of V, yield of IX

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Abs Jour : Referat Zhur - Khimiya, No 2, 1957, 4572

c) from XII in a similar manner, yield 45%; samples (a), (b) and (c) show no lowering of the melting point. Hydrazide of tosyl-S-benzyl-L-cysteinyl-L-tosyl-L-leucine (XIV) from XI (1.2 g) and 80% $N_2H_4.H_2O$ (0.12 ml) absolute CH_3OH (boiling 13 hours), yield 30%, MP 227° (from aqueous alcohol). Methyl ester of tosyl-S-benzyl-L-cysteinyl-L-tyrosyl-L-isoleucine (XV), from V and methyl ester of L-isoleucine similarly to VI, yield 33-66%, MP 193-195° (from aqueous CH_3OH). Tosyl-S-benzyl-L-cysteinyl-L-tyrosylisoleucine by alkaline hydrolysis from XV (like VI), yield 50%, MP 119-123° (from aqueous alcohol). Hydrazide of tosyl-S-benzyl-L-cysteinyl-L-tyrosyl-L-isoleucine from XV (2.6 g) and absolute hydrazine (0.25 ml) (7 days, ~ 20°), yield 80%, MP 242-243° (from aqueous alcohol). Ethyl ester of tosyl-S-benzyl-L-cysteinyl-L-tyrosyl-L-leucylglycine:

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CZECHOSLOVAKIA/Organic Chemistry - Naturally Occuring Substances and Their Synthetic Analogs E-3

Abs Jour : Referat Zhur - Khimiya, No 2, 1957, 4572

a) from XIV by azide synthesis like VI, yield 77%, MP 194-195° (from $CH_3COOC_2H_5$, then 75% alcohol); b) from ethyl ester of glycine (0.06 g) in 1 ml $POH(OC_2H_5)_2$, 0.15 ml ethyl ester of pyrophosphorous acid and from XIII (0.36 g, azeotropically dehydrated) for 30 minutes, 80-90°, then mixture poured into 50 ml water; yield 52%, MP 194-195° (from aqueous alcohol); shows no depression of the melting point with an (a) sample.

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RUDINGER, JOSEF G-3

CZECHOSLOVAKIA/Organic Chemistry - Naturally Occuring Substances and Their Synthetic Analogs. G-3

Abs Jour : Ref Zhur - Khimiya, No 8, 1958, 25322

ether; yield 78%, MP 92-93° (from aqueous alcohol); b) the reaction mixture, same as in the case of (a), and 0.25 ml CH_3CN heated for 45 minutes on a boiling water bath. After evaporation of the solvent, diluted with 7 ml ether; yield 75%; does not cause MP depression with a sample of (a). Gamma-tosyl-amino-butyryl-glycine (V) was synthesized by shaking 3.85 g IV with 16 ml 2 N NaOH until dissolved and after 30 minutes the reaction mixture was made acid; yield of crude product 95%, MP 49-51° (from water). Preparation of gamma-amino-butyryl-glycine (VI):

a) 1.5 g V in 100 ml liquid NH_3 were reduced with 0.66 g Na, and treated with Amberlite IRC-50 (see RZhKhim, 1955, 31774, 31775); yield 70%, MP 220° (decomposes; using block MP apparatus);

b) 1.2 g V, 1 g phenol and 18 ml 37% solution of HBr in

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Abs Jour : Ref Zhur - Khimiya, No 8, 1958, 25322

glacial CH_3COOH, heated 2 hours at 70° in stoppered flask. After cooling poured in 70 ml dry ether, after 2 hours the product was washed with ether, dissolved in minimum amount of water, 150 ml absolute alcohol were added, followed by NH_3 to pH 6.5; yield 88%; no depression with sample (a). Preparation of L-III: 1.3 g ditosyl-L-alpha, gamma-diamino-butyric acid and 8 ml $SOCl_2$ heated to dissolution and then for 10 minutes more. After driving off $SOCl_2$ evaporated with C_6H_6; yield 96%, MP 170-171° (from benzene with addition of petroleum ether).

Preparation of EE of ditosyl-L-alpha,gamma-diamino-butyryl-glycine (VII): 0.41 g III, 0.15 g EE of glycine and 1 ml CH_3CN, heated for 2 hours on boiling water bath, diluted with water, made acid with HCl; yield 80%, MP 136-137° (from alcohol).

Preparation of pyrrolidone L-II: to 1.83 g

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Abs Jour : Ref Zhur - Khimiya, No 8, 1958, 24322

1-CBZ-L-3-CBZ-amino-pyrrolidone-2 was prepared from 0.35 g XI and 0.29 g $C_6H_5CH_2OH$ in 2.5 ml dry C_6H_6 by boiling for 15 minutes; to the evaporation residue was added ether and the mixture was seeded; yield of crude product 91%, MP 113-114 (from EA-petroleum ether), $[\alpha]^{20}D$ - 30.4° (c 2; EA). Hydrolysis by boiling for 11 hours with 6 N HCl yielded a product of $[\alpha]^{20}D$ +32 (c 4.65; N HCl).

Concentration of alpha,gamma-diamino-butyric acid was determined on the basis of the Kjeldahl nitrogen content).

1-CBZ-DL-3-phenyl-ureido-pyrrolidone-2 was prepared from 0.48 g DL-XI in 5 ml EA and 0.23 g aniline, by allowing to stand for 1 hour at 0°; yield 61%, MP 184-186° (from aqueous dioxane).

L-derivative was synthesized analogously, MP 203-205°.

1-CBZ-L-3-CBZ-glycine-amino-pyrrolidone-2 (XII) was

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Abs Jour : Ref Zhur - Khimiya, No 8, 1958, 25322

prepared as follows:

a) from 1.08 g X the base was liberated with NH in $CHCl_3$, the $CHCl_3$ was evaporated, 0.84 g CBZ-glycine, 1.2 g $(C_2H_5)_3P$ and 2.5 ml $(C_2H_5)_2HPO_4$ were added, the mixture was heated at 100° for 30 minutes and poured in 20 ml water; the product was washed with water and a 5% solution of $NaHCO_3$; yield of crude product 88%, MP 132.5-134° (from 80% alcohol);

b) 0.26 g XI added to 0.21 g CBZ-glycine in 0.2 ml dry C_5H_5N, allowed to stand for 1 hour, then heated at 65° for 20 minutes; residue obtained on evaporation ground with 5% solution of $NaHCO_3$, crystalline product washed with water, 1 N HCl, and water, dissolved in EA, solution was filtered, dried and evaporated; yield 50%.

LL-3,8-bis-beta-CBZ-amino-ethyl-dihydroxy-piperazine-2,5 was prepared from X after isolation of base with NH_3 on

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CZECHOSLOVAKIA/Organic Chemistry. Natural Products and Their Synthetic Analogues. G-3

Abs Jour: Ref Zhur-Khim., No 24, 1958, 81801.

1955, 31774) is described, whereby the major attention is given to the preparation of two natural products. In the first case the structure of eusenine was completely proven, which was separated from the sea weed Eisenia bicyclis (see Ochira T., Bull. Agric Chem. Soc Japan, 1939, 15, 1339) The synthesized L-pyrrolydoncarbonyl-L-glutaminyl-L-alanine with its own properties (melting point, mixed melting point, optical rotation, chromatographic behavior), corresponded to a true sample of the natural product In the second case it was impossible to prove the identity of the synthesized L-pyrrolydoncarbonyl-L-glutaminyl-L-glutamine with the compound separated from the sea weed pelvetia fastigiata by Dekker

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Abs Jour: Ref Zhur-Khim., No 24, 1958, 81801.

3 hours into a suspension of 50 m. moles of L-alanine in 100 ml of tetrahydrofurane at 45°C., m p. of II = 84-86°C. (from ether - petroleum ether); to the solution of II in 100 ml etner, saturated with HCl (gas) at 0°C., 15 ml of $C_6H_5CH_2OH$ was added, and after 16 hours the mixture was concentrated until crystallization took place, yield 76% (based on alanine), m.p. 136-139°C l-tosyl-L-pyrrolidon-5-carbonyl-2L-glutamine (III) was obtained by the addition of 3 grams of the acid chloride of tosyl-L-pyrrolydon-carbonic acid (from 30 grams of tosyl-L-glutaminic acid by the action of $SOCl_2$) to 0 1 moles of L-glutamine and 0.1 moles of $NaHCO_3$ in 30 ml of water, whereupon the pH was kept in the range of 8.5 to 8.8 with 2 N NaOH

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CZECHOSLOVAKIA/Organic Chemistry. Natural Products and Their Synthetic Analogues G-3

Abs Jour: Ref Zhur-Khim., No 24, 1958, 81801.

(total 60.5 ml). Fifty milliliters of ether was poured on the filtrate, acidified with concentrated hydrochloric acid and put aside for 48 hours at 0°C., yield 49% (hydrate), m p. 187-188°C. (from water). After drying under vacuum for 7 hours over P_2O_5, anhydrous III was obtained with a melting point of 188-189°C. The benzyl ester of L-tosyl-L-pyrrolidone-5-carbonyl-2-L-glutaminyl-L-alanine was obtained by carefully mixing with 2 m. moles of III [in 5 ml of $HCON(CH_3)_2$ (IV) at -10°C.] , N-ethyl pyperidine (V), $ClCOOC_4H_9$-secondary (at -5°C.) and I + V (in 2.5 ml of IV); the mixture was heated for a short time, IV was distilled under vacuum, the residue after addition of water was washed with dilute

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CZECHOSLOVAKIA/Organic Chemistry. Natural Products and Their Synthetic Analogues. G-3

Abs Jour: Ref Zhur-Khim., No 24, 1958, 81801.

242° C. The benzyl ester of CBZ-L-glutaminyl-L-alanine (VIII) was obtained by the addition of 6 m. moles of CBZ-L-glutamine (IX) in 20 ml acetone at 0 C. to 6 m. moles of V with cooling in ice and 6.2 m. moles of ClCOOC$_4$H$_9$-iso (X), and after 20 minutes the solution of 5 m. moles of I and V in 50 ml of acetone [sic]. After 16 hours at 20° C., the gel was filtered off (the further portion from the mother liquors after concentration), washed with 0.5 M $NaHCO_3$, 1 M HCl and water; yield 82%, m.p. 198-199 C (from absolute alcohol). The L-glutaminyl-L-alanine (XI) was obtained by the hydrogenation of 4 1 m. moles of VIII (for 4 hours) in 700 ml of alcohol and 0.3 ml of acetic acid over 1 gram of 10% Pd/C, the filtrate was evaporated to dryness; yield 79%,

Card : 7/2 C

Abs Jour: Ref Zhur-Khim., No 24, 1958, 81801.

(XIII) was synthesized:

a) by reduction of 0.66 grams of VII with the aid of sodium in liquid ammonia (120 ml), the ammonia was distilled off and the residue was dissolved in 15 ml of ice-water, agitated for 15 minutes with 5 grams of amberlite IRC-50 (NH form), the ions SO_4^{--} and SO_3^{--} were removed from the concentrated filtrate with varium acetate. The filtrate was treated with the same cationite, concentrated and 3 volumes of alcohol was added for the crystallization; yield 82% of the monchydrate, m.p. 218°C. (decomposition);

b) by hydrogenation of 1.95 m. moles of XII in 50 ml

Abs Jour: Ref Zhur-Khim., No 24, 1958, 81801.

yield 79.5%, m.p. (sesquihydrate) 222-224°C. (deliquesces before 180°C.), $[\alpha]_D^{26}$ -54.2 ± 0.3 (c 1.3 water), R_f 0.49 (iso-C_3H_7OH - $C_6H_5COOCH_3$ - HCOOH - water, 3:2:1:1) does not produce any melting point depression with natural eisenone, m.p. 226-227°C. (from 99% alcohol). The sample obtained from XIII by the following method has the same melting point and similar chromatographic properties: (a) tosyl-L-glutaminyl-L-glutamine (XIV) was obtained by boiling 20 grams of monohydrate of III in 60 ml of 20% ammonia for 25 minutes, by acidifying with concentrated HCl at 0°C.; the crystalline product was washed with water and alcohol; yield 93%, m.p. 215-218°C. (Kofler block). L-glutaminyl-L-glutamine (XV) was synthesized by the

Abs Jour: Ref Zhur-Khim., No 24, 1958, 81801.

was obtained by adding with agitation 12.7 m. moles of XV and 25 m. moles of $NaHCO_3$ in 40 ml water and 1.6 ml of 4 N NaOH, and 12.8 m. moles of the acid chloride of tosyl-L-pyrrolidone-5-carbonic acid and 1.6 ml of 4 N NaOH. Then the filtrate was acidified; yield 31%, m.p. 214-216°C. (block; from aqueous alcohol). Tosyl-L-glutaminyl-L-glutaminyl-L-glutamine (XVII) was obtained by boiling 2 grams of XVI in 20 ml of 15% ammonia for 15 minutes, by acidifying the filtrate with concentrated HCl, washing with water and alcohol; yield 93% (hydrate), m.p. 200-202°C. (block), γ - γ -diethyl ester of CBZ- α-L-glutaminyl-L-glutaminic-acid (XVIII). X was added to the solu-

Abs Jour: Ref Zhur-Khim., No 24, 1958, 81801.

acid (XX). X was added to the solution of XVIII and V in 10 ml of tetrahydrofurane (-10° C.), after 30 minutes at 20° C. the solution was cooled to 0° C. and the solution of XIX-a was added, (for all previous compounds, 2 m. moles were always added), and 4 m. moles V in 5 ml water. After 16 hours at 20° C., the separated gel which was formed as the result of concentration, was dissolved in 0.5 M $NaHCO_3$. A gel-like product was obtained by an extraction of the solution with ether and acidifying to a pH of 1; yield 51%, m.p. 109-112° C. (from aqueous methanol). CBZ-L-glutaminyl-L-glutaminyl-L-glutamine (XX) was obtained by reacting 1.13 grams of XX [sic], 1 ml of ethylene glycol and 20 ml of liquid ammonia

Abs Jour: Ref Zhur-Khim., No 24, 1958, 81801.

to dryness, the residue was suspended in 10 ml of hot water, cooled and washed with alcohol; yield 80% (crude), m.p. 226-232° C. (block; from water), the product was chromatographically homogeneous.

b) Shaking 0.64 grams of XXI with 5 ml of a saturated solution of HBr (gas) in glacial acetic acid for 45 minutes and diluting with ether, the separated hydrobromide was dissolved in water, pH was brought to 5.5 with LiOH, free XXII was precipitated with alcohol, was again dissolved in water and was filtered through basic anionite MFD (acetate form) and through amberlite IRC-50 (H^+ form); after lyophilic drying, yield 88%, m.p. (monohydrate) 228-230° C. (decomposition); the

separated; yield 85 milligrams, m.p. 200-201° C. (block), $[\alpha]_D^{20}$ -34.9 ± 0.7 (c 2.8, water); an additional 42 milligrams was obtained from the mother liquors, m.p. 195-198° C., total yield 46%; (b) by boiling 770 mg of XXII obtained by the above method (b) with 50 ml water for 20 hours, filtering through a column of sulfonic ionite F4M and concentration; yield 59.5%, m.p. 201-203° C. (capillary), the analytical sample m. p. 203-204° C. (block), 218-222° C. (capillary) (from 80% alcohol), $[\alpha]_D^{20}$ -35.3 ± 0.3° (c 2.1 water). R_f 0.76 (phenol, water, NH). The purity of the L-form was determined by Khkoda and Zaoral, using the new fermentative method (was sug-

SICHER, J.: RAJSNER, M.; HUDINGER, J.; ECKSTEIN, M.; SORM, F.

Amino acids and peptides. XXVIII. Synthesis of threo- and erythro-dl-α,γ-diamino-β-hydroxybutyric acid (γ-aminothreonine and γ-amino-allothreonine). In English. Coll.Cz.Chem. 24 no.11:3719-3729 N '59. (EEAI 9:5)

1. Department of Organic Synthesis, Institut of Chemistry, Czechoslovak Academy of Science, Prague. 2. On leave of absence from the Medical Academy, Krakow, Poland (for Eckstein).
(Amino acids) (Peptides) (Allothreonine) (Amino group) (Threonine)

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1. Department of Organic Synthesis, Institute of Chemistry, Czechoslovak Academy of Science, Prague.

(Amino acids) (Peptides) (Arginine) (Citrulline)

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(EEAI 10:9)

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(Amino acids) (Peptides) (Phthalimide)
(Phthalyl amino acids) (Polarograph and polarography)

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Amino acids and peptides. Part 33: Nitrosyl chloride and butyl nitrite as reagents in peptide synthesis by the azide method; suppression of amide formation. Coll Cz Chem 26 no.9:2333-2344 '61.

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(Amino acids) (Peptides) (Nitrosyl chloride) (Butyl nitrite)

JOST, K.; RUDINGER, J.

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1. Institute of Organic Chemistry and Biochemistry, Czechoslovak Academy of Sciences, Prague.

(Amino acids) (Peptides) (Cysteine)

JOST, K.; RUDINGER, J.; SORM, F.

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1. Second Chemical Institute of the University, Vienna, and Institute of Organic Chemistry and Biochemistry, Czechoslovak Academy of Sciences, Prague.

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Amino acids and peptides. Pt.38. Coll Cz Chem 28 no.7:1706-1714 Jl '63.

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JOST, K.; RUDINGER, J.; SORM, F.

Amino acids and peptides. Pt.39. Coll Cz Chem 28 no.8:2021-2030 Ag '63.

1. Institute of Organic Chemistry and Biochemistry, Czechoslovak Academy of Sciences, Prague.

JOST, K.; DEBABOV, V.G.; NESVADBA, H.; RUDINGER, J.

Amino acids and peptides. Pt.42. Coll Cz Chem 29 no.2:419-436 F '64.

1. Institute of Organic Chemistry and Biochemistry, Czechoslovak Academy of Sciences, Prague (for Jost and Rudinger). 2. Institute of Organic Chemistry, Academy of Sciences of the U.S.S.R., Moscow (for Debabov). 3. Peptide Laboratory, Sandoz A.G., Vienna (for Nesvadba).

CZECHOSLOVAKIA

PODUSKA, K; RUDINGER, J

Institute of Organic Chemistry and Biochemistry, Czechoslovak Academy of Sciences, Prague - (for both)

Prague, Collection of Czechoslovak Chemical Communications, No 7, July 1966, pp 2938-2954

"Amino acids and peptides. Part 62: Synthesis of a protected cyclodecapeptide containing α,γ-diaminobutyric acid."

APPROVED FOR RELEASE: 06/20/2000 CIA-RDP86-00513R001445920016-9"

CZECHOSLOVAKIA

PODUSKA, K; RUDINGER, J.

Institute of Organic Chemistry and Biochemistry of the Czechoslovak Academy of Sciences, Prague (for both)

Prague, Collection of Czechoslovak Chemical Communications, No 10, 1965, pp 3325-3331

"Amino Acids and Peptides. LVIII. Cyclization of Peptides with 2- ethyl-5- benzisoxazolium-3'-sulphonate."

CZECHOSLOVAKIA

KASAFIREK, E; RABEK, V; RUDINGER, J; SORM, F

1. Institute of Pharmacy and Biochemistry - (for ?):
2. Institute of Organic Chemistry and Biochemistry - (for ?). Both Institutes of Czechoslovak Academy of Sciences.

Prague, Collection of Czechoslovak Chemical Communications, No 12, December 1966, pp 4581-4591

"Amino acids and peptides. Part 66: Synthesis of ten extended-chain analogues of lysine vasopressin."

CZECHOSLOVAKIA

DOUSA, T.; PLISKA, V.; RUDINGER, J.; JOST, K.; CORT, J.H.; Department of Vascular Diseases (Ustav pro choroby krevniho obehu), and Institute Organic Chemistry and Biochemistry, Czechoslovak Academy of Sciences (Ustav pro organickou chemii a biochemii CSAV), Prague.

"Role of the Disulfide Bridge in the Oxytocin Molecule and its Effect on Tissue Receptors."

Prague, Ceskoslovenska Fysiologie, Vol 14, No 5, Oct 1965; p 343-344.

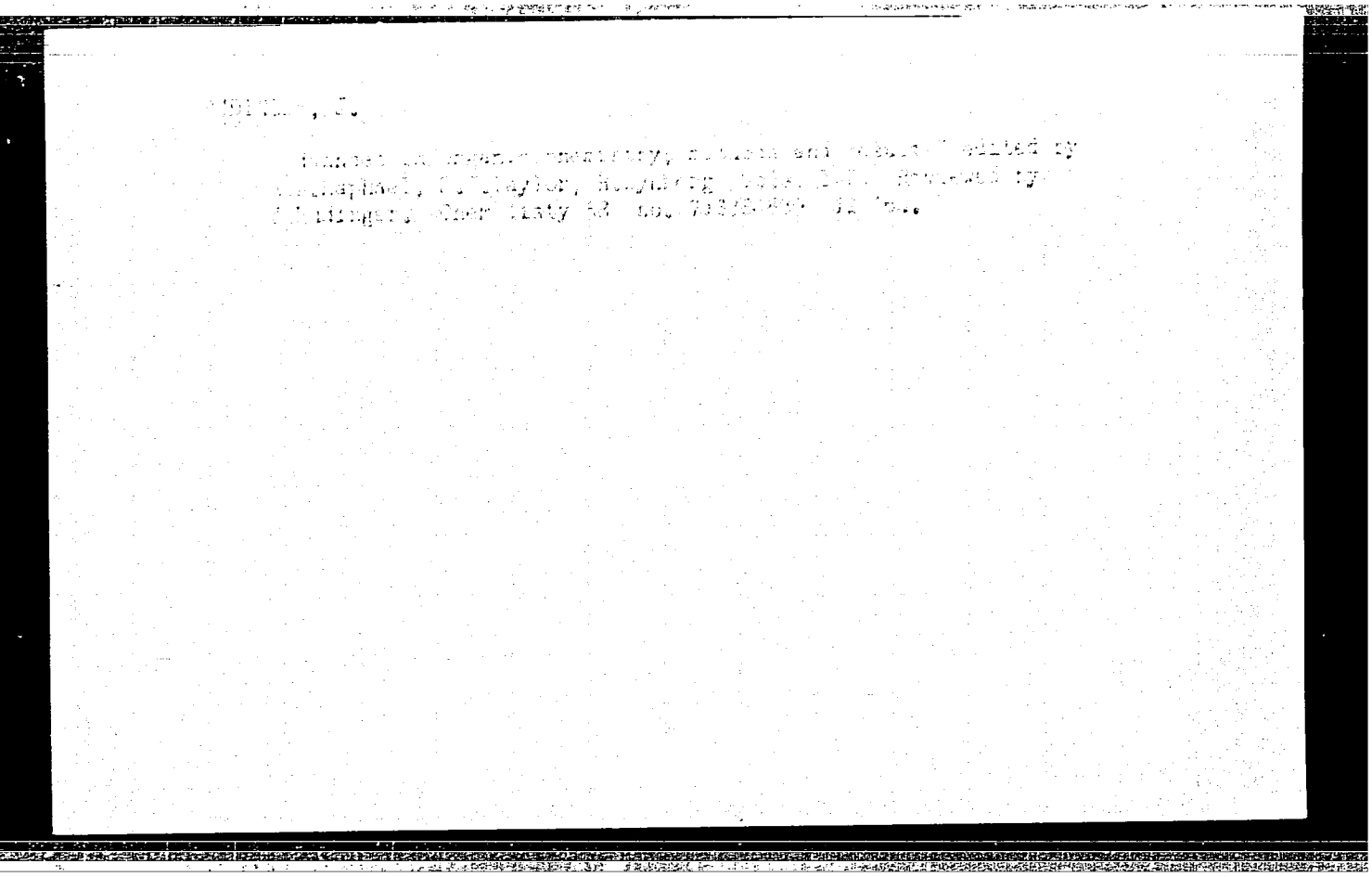
Abstract: Study using synthetic desamino-oxytocin in frog skin permeability to sodium and rat diuresis experiments indicate that neither the disulfide bridge nor either of the sulfur atoms is essential for oxytocin activity, nor is the reduction of the disulfide bridge essential to oxytocin inactivation in tissues. Paper presented at the 15th Physiology Days, Olomouc, 27 May 65.

1/1

BLAHA, K.; RUDINGER, J.

Amino acids and peptides. Pts.47,48. Coll Cz Chem 30 no.2: 585-604 F '65.

1. Institute of Organic Chemistry and Biochemistry of the Czechos[illegible] Academy of Sciences, Prague. Submitted July 23, 1964. 2. Chief Editor, "Collection of Czechoslovak Chemical Communications" (for Blaha).



RUDINGER, J.; FAKASOVA, H.; GUT, V.

Amino acids and peptides. Pts. 40-41. Coll Cz Chem 28 no.11:2941-2968 N'63.

1. Institute of Organic Chemistry and Biochemistry, Czechoslovak Academy of Sciences, Prague.

YUGOSLAVIA

RUDINSKI, A. /affiliation not given/.

"Current Infectious Diseases in Geese."

Belgrade, Veterinarski Glasnik, Vol 17, No 3, 1963, pp 269-273.

Abstract: The most prevalent infectious diseases of a bacterial nature which currently threaten geese are cholera (which appears sporadically throughout the year but which can take on an endemic character at the beginning of autumn), salmonellosis, spirochetosis, and influenza (septicaemia anserum exudativa). References to 12 German and Yugoslav works of recent date.

1/1

RUDINGER, J.

Peptide synthesis with α-aminoadipic acid. Coll Cz Chem 27 no.9:2246-2248 S '62.

1. Institute of Organic Chemistry and Biochemistry, Czechoslovak Academy of Sciences, Prague.

CZECHOSLOVAKIA

[illegible]VANDA, H; HONZL, J; RUDINGER, J.

1. Second Chemical Institute of the University, Vienna;
   2. Institute of Organic Chemistry and Biochemistry of the Czechoslovak Academy of Sciences, Prague
   (for all)

Prague, Collection of Czechoslovak Chemical Communications,
[illegible], [illegible], [illegible]

"Amino Acids and Peptides. [illegible]. Some Structural Analogues of Oxytocin Modified in Position 3 of the Peptide Chain: Synthesis and Some Chemical and Biological Properties."

RUDIGER, W

1790. Effects of electrical stimulation of the auditory cortex on conditioned reflex activity in dogs. W. Rüdiger, E. Grastyán, and I. Madarász *Acta physiol. Acad. Sci. hung.*, 1956, 9, 163—172 (Physiol. Inst., Med. Univ., Pécs, Hungary).—Parotid secretion was conditioned on 2 different sound stimuli. Permanent electrode pairs were inserted into the cortex, 2 pairs into the motor, one into the auditory cortex. Electrical stimulation of the auditory cortex simultaneously with or shortly after the positive conditioned sound stimulus inhibited the conditioned salivary response. If the same electrical stimulation was used after the conditioned stimulus as a secondary conditioned stimulus, it elicited a conditioned salivary response having become a conditioned stimulus. Electrical stimulation of the auditory cortex alone can serve as conditioned stimulus. (German)

A. B. L. Beznák

3

FULIN-SNOTOVA, E.A.

Phosphorus absorption in the intestinal tract and its utilization by the organism in experimental hepatitis of different origins. K. S. Zamychkina, E. A. Rudik-Gnutova, D. E. Grodzenskii, and L. I. Belorybkina. *Med. Radiologiya* 1, No. 3, 63–71(1956).—Exptl. hepatitis was produced by 2 methods: (a) 0.1–0.2 g. of CCl_4/kg. of body wt. was injected subcutaneously into dogs 5 separate times at 3-day intervals; (b) 0.1–0.2 g./kg. of body wt. of Na salicylate was administered to dogs orally daily for 10–12 days. Under study was also a group of dogs with spontaneous hepatitis naturally contracted. $Na_2HP^{32}O_4$ in 250 ml. of milk (2–3 microcuries/kg. of body wt.) was fed to the hepatitis and control dogs. Supplemental tests were performed with control dogs receiving similar $Na_2HP^{32}O_4$ doses intravenously. Blood samples were secured 30, 60, 90, 120, 180, 240, and 300 min. after the administration of the P^{32} compound. Blood serum was analyzed for total and inorganic P and its general and specific activity. In jaundice-free exptl. hepatitis resulting from the administration of drugs or from spontaneous infection the concn. of P in the blood serum (total and inorganic) did not differ from that of the control dogs. The oral administration of P^{32} caused the curves of specific activity of total and inorganic P^{32} to assume forms different from those obtained in normal dogs. In animals receiving P^{32} by the subcutaneous route the difference in the curves in sick and control dogs was not as sharply expressed. The processes of P absorption and utilization are markedly disturbed in animals with liver pathology.

B. S. L.

RUDINKIN, Yu.A., gornyy inzh.

Classifying fized capital in the coal industry. Ugol' 33 no.9:38-42 S '58. (MIRA 12:1)
(Mining industry and finance)
(Coal mines and mining--Equipment and supplies)

ASTAKHOV, A.; RACHKOVSKIY, S.; RUDINKIN, Yu.

Time consumed by underground mining operations and ways to reduce it. Biul. nauch. inform.: trud i zar. plata 3 no. 11:10-14 '60. (MIRA 14:1)
(Krivoy Rog Basin—Iron mines and mining)

RUDINKIN, Yu.A., kand.ekonom.nauk; MINEVICH, A.S., kand.ekonom.nauk

Determining levels of labor mechanization and production in the coal industry. Ugol' 39 no.11:42-45 N '64.
(MIRA 18:2)

1. Institut gornogo dela im. A.A.Skochinskogo.

RUDINKIN, Yu.A., inzh.

Reproduction of capital assets in open pits of the coal industry. Nauch.soob.Inst.gor.dela 7:28-92 '61. (MIRA 15:1)
(Coal mines and mining—Finance)

BURSHTEYN, G.Ya., doktor ekonomicheskikh nauk; RUDINKINA, I.V., gornyy inzhener; RUDINKIN, Yu.A., gornyy inzhener.

The work of mixed brigades; from materials of the Lenin Coal Trust mine survey. Ugol' 30 no.12:15-18 D '55. (MLRA 9:2)

1.Vsesoyuznyy ugol'nyy institut.
(Kuznetsk Basin--Coal mines and mining)

[redacted], Yuriy Aleksandrovich; [redacted], M.B., retsenzent

[Amortization of capital assets in the mining industry]
Amortizatsiia osnovnykh fondov v gornoi promyshlennosti.
Moskva, Izd-vo "Nedra," 1964. 6[illegible]. (MIRA 17:7)

BURSHTEYN, G.Ya., doktor ekonomicheskikh nauk; RUDINKINA, I.V., gornyy inzhener; RUDINKIN, Yu.A., gornyy inzhener.

The work of mixed brigades; from materials of the Lenin Coal Trust mine survey. Ugol' 30 no.12:15-18 D '55. (MLRA 9:2)

1.Vsesoyuznyy ugol'nyy institut.
(Kuznetsk Basin--Coal mines and mining)

[redacted], L. N.

"Certain Problems of Plastic Bend." Thesis for degree of Cand. Technical Sci., Sub 24 Oct 49, Moscow Order of Lenin Aviation Inst imeni Sergo Ordzhonikidze.

Summary 82, 18 Dec 52, Dissertations Presented for Degrees in Science and Engineering in Moscow in 1949. From Vechernyaya Moskva, Jan-Dec 1949.

RUDINOV, A.B.

Automobile trailers. Stroi.prom. 34 no.10:45-46 O '56. (MLRA 9:12)
(United States--Automobiles--Trailers)

KUDINOV, V.A.; SELIUKOV, Yu.Z.

Preventing vibrations of a transverse planing machine. Stan. i instr. 31 no.5:7-10 My '60. (MIRA 14:5)
(Planing machines—Vibration)

POLAND/Chemical Technology. Chemical Products and Their Application. Instruments and Automation H-3

Abs Jour : Ref Zhur - Khim., No 24, 1958, No 81912

Author : Naczynski J., Rudinska J., Tromszcynski J.
Inst : -
Title : Control and Automatic Regulation of Technological Processes of Gas Industry

Orig Pub : Gas, Woda i techn. sanit., 1958, 32, No 3, 118-121

Abstract : Reviewed are the basic integral parts of coke-gas industry with a description of modern instruments and apparata employed for the automatic control of temperature, pressure, humidity, O_2 content, and other process variables involved. Six technological flow diagrams are attached that depict position of such instruments and indicate their interrelation with regard to operation of the whole operationsl blocks or departments, as well as to operating characteristics of the coal gasification process. -- Yu. Skoretskiy.

Card : 1/1

C-7

RUDINSKAYA, E. M.

7

PROCESSES AND PROPERTIES INDEX

Determination of oxidizability in the analysis of air. V. G. Gurevich, K. M. Rudinskaya, and V. P. Protopopova. *Zavodskaya Lab.* 12, 122 (1946). The oxidizability of air can be used as a criterion of its purity. The oxidizability of air is defined as the no. of mg. of O consumed in the oxidation by KIO_3 in H_2SO_4 soln. of all reducing substances in 1 l. of air under standard conditions. An evacuated flask (especially designed for the analysis) is filled with the air sample, the contaminated air is oxidized in the flask by means of KIO_3 in concd. H_2SO_4. In the absence of reducing agents this mixt. does not decomp. at 105° (only 0.1-0.2% is decompd.), but it oxidizes at this temp. nearly all org. substances, except CH_4 and some heterocyclic compds. of N; the oxidation proceeds nearly completely to CO_2, without the formation of CO. The quantity of O consumed is detd. by the quantity of I liberated in the presence of reducing agents according to $I_2O_5 = I_2 + 5\ O$. The I is detd. colorimetrically by the intensity of the yellow-brown color of its solns. in mixts. with dil. H_2SO_4 and KIO_3. The I reacts with the oxidizing mixt. with the formation of the green of $I_2O_3.SO_3$-type compds. On diln. with water, this compd. decomp. rapidly according to $5I_2O_3.SO_3 + 8H_2O = 2I_2 + 6HIO_3 + 5H_2SO_4$. W. R. Henn

ASM-SLA METALLURGICAL LITERATURE CLASSIFICATION

[redacted], Yakovlev, V.V., kand. fiz.-matem. nauk, dotsent

Sheet effect in irridescent fabrics. Tekst. prom. 24 no.11: 57-62 N '64. (MIRA 17:12)

1. Shveynaya fabrika "40 let VLKSM", g. Tiraspol'(for Rudinskaya).
2. Leningradskiy elektrotekhnicheskiy institut svyazi (for Yakovlev).

YUGOSLAVIA

RUDINSKI, Albe, Institute of Pathology (Institut za Patalogiju).

"Contribution to the Knowledge of Tuberculosis among Poultry."

Belgrade, Acta Veterinaria, Vol 13, No 1, 1963, pp 47-54.

Abstract: [Author's Serbocroatian summary modified] To acquaint himself with tuberculosis among poultry raised in the local geographic area, the author conducted pathoanatomical and pathohistological studies of 5781 dead chickens in the Subotica export slaughter house plus 28 from private farm households and 374 from a poultry farm, and took tuberculosis tests of 682 chickens from 42 private farms and of 1343 from a poultry farm. He established tuberculosis in 95 percent of the cachectic corpses and 4.11 percent of the chickens from private farms. He provides detailed statistics on tuberculosis among chickens originating in the state poultry farm and found incidence highest in the Rhode Island breed, followed by the New Hampshire, Leghorn, Sussex, Plymouth Rock, and White Rock. In practical work to uncover those which had reacted to the tuberculosis test, every island in excess of 0.5 millimeters represented a positive reaction.

Two tables, no references.

1/1

RUDINSKIY, A.A., inzh.

Train finishing work masters. Biul. tekhn. inform. 4 no.9: 13-15 S '58. (MIRA 11:10)
(Plastering) (Painting, Industrial)

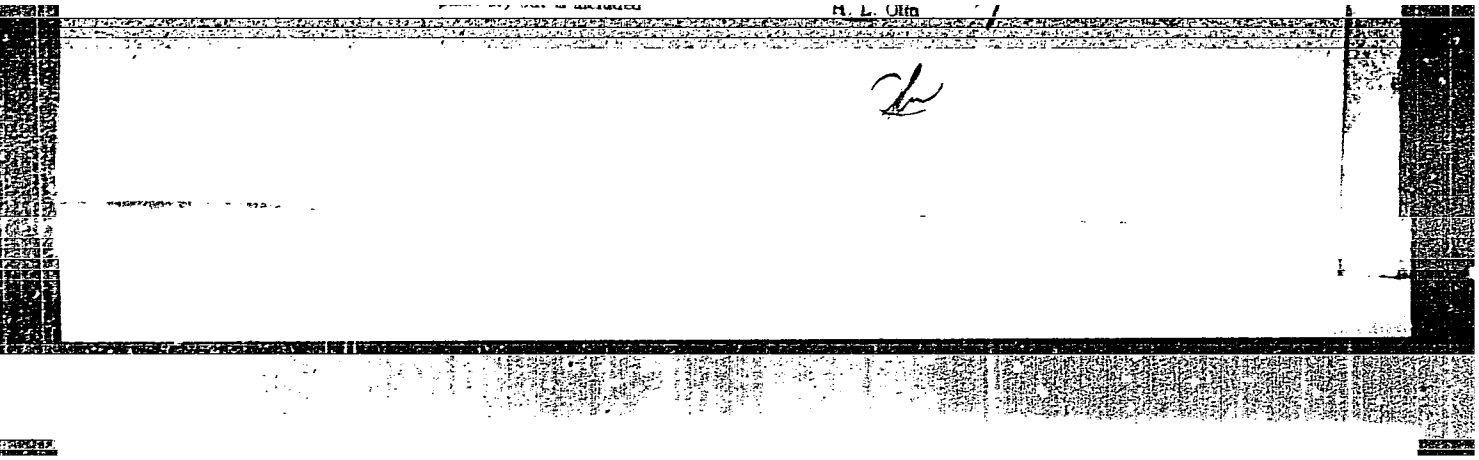
RUDZINSKI, BRONISLAW

Rudziński, Bronisław: Urządzenia do oczyszczania wody. Warsaw: Budownictwo i Architektura. 1956. 285 pp. Math. 1

27

A process for producing sulfuric acid by the method of wet catalysis. S. A. Dzhobadze and E. Rudinskii. *Gazovaya Prom.* 1958, No. 1, 16–19.—Gases produced in the desorption of monoethylamine solns. used in purifying generator gases contg. 5.5–6.0% H_2S and 93.0–3.5% CO_2 are used for making H_2SO_4 by a modified contact process. Conversion to SO_3 takes place in a furnace provided with a layer of 46 cm. of grog packing and 150 cm. of bauxite through which the gases pass and which serve to catalyze the reaction. Emerging at temps. of 650–80° the gases are cooled to 450° in an exchanger and then passed to the acid converter provided with catalyst "BAV." The converter gases with a 2.5–3.0% SO_2 content are fixed, not by chem-

4



RUDINSKIY, Stepan Yakovlevich; ROZHNETSKIY, G.A., kand. tekhn. nauk, dots., retsenzent; ZAMANSKIY, S.M., inzh., red.; PILIPENKO, Yu.P., red.; GORNOSTAYPOL'SKAYA, M.S., tekhn. red.

[Machine tools; collected problems and laboratory work] Metallorezhushchie stanki; sbornik zadach i laboratornykh rabot. Moskva, Mashgiz, 1961. 380 p. (MIRA 15:3)
(Machine tools)

RUDINSHTEYN, P.

"On the Meissner-Ochsenfeld Effect," Zhur. Eksper. i Teoret. Fiz., 11, No. 1, 1941.

Ural Affiliate, Sverdlovsk, Acad. Sci. USSR, -1940-.

DZHOBADZE, S.A.; RUDINSKIY, Ye.

Producing sulfuric acid by the wet contact process. Gaz. prom. no.1: 16-19 Ja '58. (MIRA 11:2)

(Sulfuric acid)

BELOUSOV, Yu.A.; KORCHANOV, A.T.; RUDINSKIY, Ye.Ya.; STEPNOVA, Ye.V.; BANNIKOV, N.A., red.; ZAPIVAKHIN, A.I., red.; LAPIDUS, M.A., red.; RAKITINA, Ye.D., red.; TERESHCHENKO, N.I., red.; FREYDMAN, S.M., red.; BALLOD, A.I., tekhn.red.

[Manual on rural subsidiary enterprises] Spravochnik po sel'skim podsobnym predpriiatiiam. Moskva, Gos.izd-vo sel'khoz.lit-ry, 1960. 798 p. (MIRA 13:12)
(Manufactures) (Farm produce)

OSHEROVICH, A.L.; RODIONOV, S.F.; YAKHONTOVA, V.Ye.

Absolute brightness of some areas in the Milky Way. Dokl.AN SSSR 111 no.2:316-318 N '56. (MLRA 10:1)

1. Leningradskiy gosudarstvennyy universitet imeni A.A. Zhdanova. Predstavleno akademikom A.A. Lebedevym.
(Milky Way)

RUDIS, M.

RUDIS, M. Movement of floating silt in currents with a transversal circulation. p. 524, Vol 5, no 6, 1956 SOVETSKA VEDA: STAVEBNICTVI Praha, Czechoslovakia

SOURCE: EAST EUROPEAN ACCESSIONS LIST (EEAL) VOL 6 NO 4 APRIL 1957

RUDIS, M.; MACHEK, J.

Photometric measurement of concentration of identical spheric particles in water. p. 306.

VODOHOSPODARSKY CASOPIS. (Slovenska aka demia vied) Bratislava, Czechoslovakia, Vol. 7, no. 4, 1959

Monthly List of East European Accession (EEAI), LC VOL. 9, no. 2, Feb. 1960

Uncl .

RUDIS, Miroslav

Theoretical calculation of changes in the distribution of homogeneous suspension concentration in a steady gradually slowing down flow. Rozpravy techn CSAV 73 no.7:1-39 '63.

SMUTEK, Rados, inz., CSc.; RUDIS, Miroslav, inz., CSc.

Some experiences with the measurement of water turbulence.
Vodohosp cas 11 no.2:197-206 '63.

1. Ustav pro hydrodynamiku, Ceskoslovenska akademie ved, Praha.

RUDIS, Miroslav, inz., C.Sc.; MACHEK, Josef

An estimate of the total amount of suspended sediment in a reservoir. Acta techn Cz 8 no.1:80-100 '63.

1. Institute of Hydrodynamics, Czechoslovak Academy of Sciences, Praha 6, Podbabska 13 (for Rudis). 2. Charles University, Department of Mathematical Statistics, Praha 3, Sokolovska 83 (for Machek).

MARTSINOVSKIY, V.A.; RUDIS, M.A.

Dynamics of rotors of hydraulic machines. Teor. mash. i mekh. no. 98/99:18-27 '64. (MIRA 17:9)

SOV/179-59-2-21/40

AUTHOR: Rudis, M. A. (Moscow)

TITLE: The Calculation of the Symmetrical Deformation of Conical and Spherical Shells of Constant Thickness (K raschetu simmetrichnoy deformatsii konicheskoy i sfericheskoy obolochek postoyannoy tolshchiny)

PERIODICAL: Izvestiya Akademii nauk SSSR OTN, Mekhanika i mashinostroyeniye, 1959, Nr 2, pp 147-150 (USSR)

ABSTRACT: A solution is obtained in complex form for conical and spherical shells on the basis of Novozhilov's general solution for thin shells (Ref 3). For conical shells, the problem leads to a first-order Bessel equation which is solved for large argument in terms of Hankel functions. For spherical shells, the problem leads to a zero-order Bessel equation, the solution of which is obtained as a rapidly converging power series. As an example, expressions

Card 1/2

The Calculation of the Symmetrical Deformation of Conical and Spherical Shells of Constant Thickness

are obtained for the bending moments and stresses in a conical shell clamped at the meridian point and subjected to internal pressure. There are 4 Soviet references.

SUBMITTED: August 8, 1958.

RUDIS, M.A., inzh.

Stress analysis of spiral outlets of centrifugal pumps. Energomashinostroenie 5 no.2:32-34 F '59. (MIRA 12:3)
(Centrifugal pumps)

AUTHOR: Rudis, M.A., Engineer SOV/122-59-6-5/27

TITLE: On the Selection of the Wall Thickness of a Centrifugal Pump Spiral Casing

PERIODICAL: Vestnik mashinostroyeniya, 1959, Nr 6, pp 20-22 (USSR)

ABSTRACT: The wall thickness of centrifugal pump spiral casings is usually stressed by the simple "boiler" formula.. Experimental studies have shown this stress to be a substantial underestimate owing to the presence of bending and the simple evaluation therefore yields only a value for comparison. An analysis shows that the stress and thus the wall thickness can be related to the basic performance quantities of the pump, namely, delivery, pressure and speed (Eq 8) combined in the specific speed. This functional relation is illustrated (Figure 2) by a curve representing points of actual production model pumps. The ratio of the wall thickness to the diameter of the impeller is approximately constant (0.04) with a maximum scatter of 30% either way. This relation, derived from practical designs, is ill-founded and it is shown that the stress rises with the square of the impeller diameter.

Card1/2

SOV/122-59-6-5/27

On the Selection of the Wall Thickness of a Centrifugal Pump Spiral Casing

A practical procedure is suggested. The nominal stress should be about 125 kg/cm^2 for cast iron and about 225 kg/cm^2 for cast steel.
There are 2 figures and 1 table.

Card2/2

RUDIS, M.A., inzh.

Approximate calculation of starting characteristics of adjustable-blade hydraulic turbines. Trudy VIGM no.24:179-189 '59. (MIRA 12:8)

(Hydraulic turbines)

L 12881-66 EWT(m)/EWP(w)/EWP(v)/T-2/EWP(k)/ETC(m) IJP(c) WW/EM

ACC NR: AT6001266 SOURCE CODE: UR/0000/65/000/000/0186/0200

17
B+1

AUTHOR: Rudis, M. A.

ORG: none

TITLE: Some problems concerning the dynamics of turbomachine rotors

SOURCE: Prochnost' i dinamika aviatsionnykh dvigateley (Strength and dynamics of aircraft engines); sbornik statey, no. 2. Moscow, Izd-vo "Mashinostroyeniye," 1965, 186-200

TOPIC TAGS: rotor vibration, pump impeller, pump impeller vibration, critical speed, pump design

ABSTRACT: Present trends in high-speed turbomachinery development have focused attention on the problem of rotor dynamics calculations, and, in particular, on pump impeller vibration which is greatly influenced by the fluid being pumped. This article presents a detailed analysis of the dynamics of a rotary-pump impeller with special emphasis on the effect of hydrodynamic forces developed in the clearance between the sealing ring and the impeller blade tips. Formulas are derived for calculating stable pump operating regimes and the amplitude of impeller vibration during unstable operation. The obtained results indicate that: 1) Hydrodynamic forces increase the critical speed of the impellers; 2) the unstable operation of the pump impeller is due to hydrodynamic forces which tend to impart precessional motion to the impeller; and 3) under unstable operating regimes, the vibration amplitude is

UDC: 62-253:62-135:531.3

Card 1/2

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limited, i.e., its magnitude reaches the value equal to the annular clearance only if the impeller angular speed approaches a critical value. Although, the results presented are in good agreement with the available experimental data on stationary-compressor dynamics, further experimental verification is needed. Orig. art. has: 49 formulas and 5 figures.

[AS]

SUB CODE: 13/ SUBM DATE: 17Jul65/ ORIG REF: 013/ OTH REF: 001/ ATD PRESS 481

Card 2/2 HW

L 58466-65 EWT(d)/EWT(m)/EWP(w)/EWA(d)/EWP(v)/T-2/EWP(k)/EWA(h) Peb
WW/EM

ACCESSION NR: AP5013133 UR/0373/65/000/002/0088/0094

AUTHORS: Listrova, Yu. P. (Voronezh); Rudis, M. A. (Voronezh) 29

TITLE: On the equilibrium limit of nonhomogeneous plates and shells of revolution under segment-linear plasticity conditions

SOURCE: AN SSSR. Izvestiya. Mekhanika, no. 2, 1965, 88-94

TOPIC TAGS: shell theory, plasticity theory, yield point, continuum mechanics, stress load

ABSTRACT: The yield hypersurface of shell of revolution was studied parametrically for a rigid-plastic material. The shell is assumed to be loaded symmetrically, subject to the Tresk yield condition expressed by the hexagon ABCDEF of Fig. 1 on the Enclosure. This condition is given by

$$\max|\sigma_i - \sigma_j| = k(z, \theta) \qquad (i \neq j = 1, 2)$$

The deformation rate in the direction of the normal to the shell surface is depicted by a straight cut KL (see Fig. 2 on the Enclosure). To obtain parametric representations of the faces of the hypersurface, three positions are con-

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ACCESSION NR: AP5013133

sidered for the cut KL as shown on Fig. 3 on the Enclosure, and the yield point is assumed to vary linearly with the shell thickness or,

$$k(z) = k_0 + 2k_1 z/h \ .$$

The example of a spherical shell is considered under an internal pressure p with clamped edges. Using the parametric representations derived above, the following expression is obtained for the limiting pressure

$$p^* = \frac{1}{2} p_0 [1 + F_1(\beta, \theta_0) + \gamma F_2(\beta, \theta_0)]$$

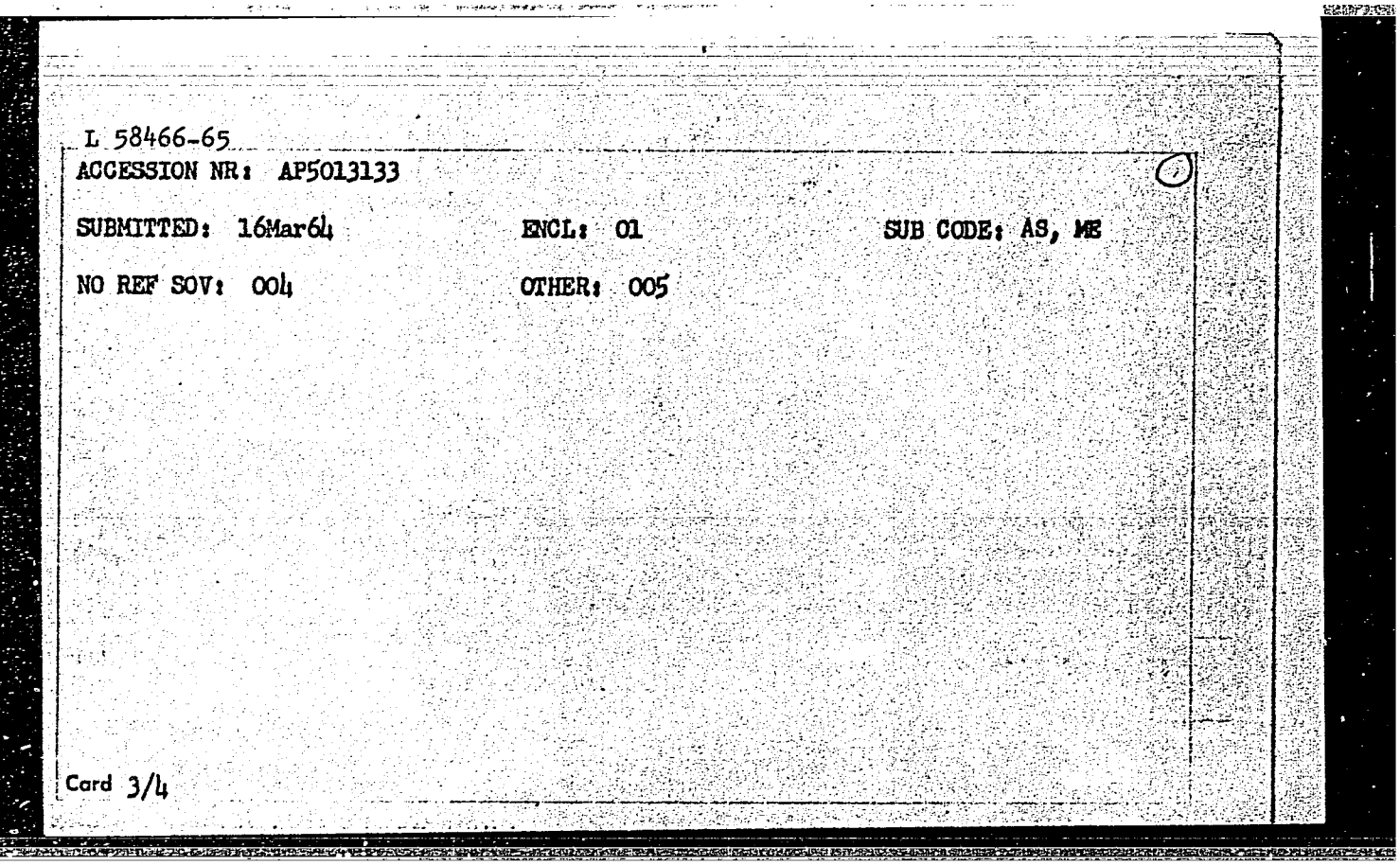
where

$$F_1(\beta, \theta_0) = [\sin^2\theta_0/4\beta - 2\beta \ln(1 - 1/2\beta)\cos^2\theta_0 - (1 + 1/4\beta)\cos^2\theta_0](1 - \cos\theta_0)^{-2}$$

$$F_2(\beta, \theta_0) = \left\{\left[\frac{4\beta^2 - 3\beta + 1}{\beta(1 - 1/2\beta)^2} - 6\frac{4\beta^2 - 1}{1 - 1/2\beta} - 24\beta^2 \ln\left(1 - \frac{1}{2\beta}\right) + \right.\right.$$
$$\left.\left. + 20\beta^2 - 4\beta - 3\right]\cos^2\theta_0 - \frac{1}{\beta}\right\}(1 - \cos\theta_0)^{-2} \ .$$

Orig. art. has: 34 equations and 4 figures.

ASSOCIATION: none



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Card 3/4

L 58466-65

ACCESSION NR: AP5013133

ENCLOSURE: 01

6

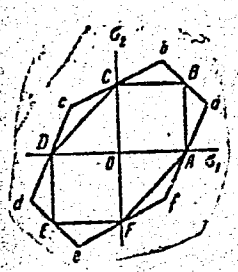

Fig. 1

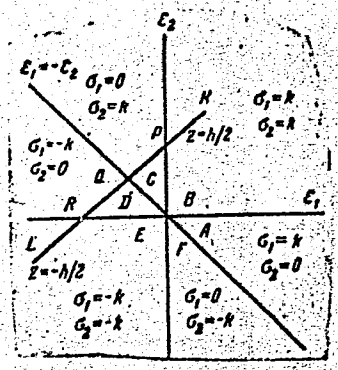

Fig. 2

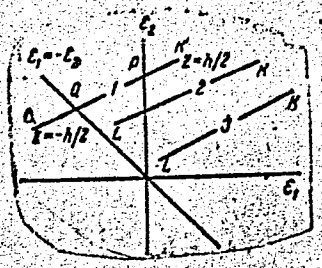

Fig. 3

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ACCESSION NR: AP3003460 S/0179/63/000/003/0119/0123

AUTHOR: Listrova, Yu. P.; Rudis, M. A. (Voronezh)

TITLE: Ultimate equilibrium of a toroidal shell

SOURCE: AN SSSR, Izv. Otdel. tekhn. nauk. Mekhanika i mashinostroyeniye, no. 3, 1963, 119-123

TOPIC TAGS: elasticity, plasticity, strain, stress, torroidal shell

ABSTRACT: The carrying capacity of a toroidal rotary shell, made of rigid-plastic material and with a uniformly distributed pressure load, and whose edges $\theta = 0$ and $\theta = \pi$ are mounted relative to radial and axial motions, is studied. The problem is solved by a kinematic method which gives the upper estimate of the maximum pressure. The lower estimate is obtained from a consideration of the statically permissible stress fields satisfying the condition of a momentless stress state of the toroidal shell. For a toroidal shell

$$r_1 = r_0, \qquad r_2 = R_0 \frac{1 + \alpha \sin\theta}{\sin\theta} \qquad \left(\alpha = \frac{r_0}{R_0}\right) \tag{1.2}$$

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where r_1 and r_2 are the main radii of curvature, θ is the angle between the axis of rotation of the shell and a normal and differentiation with respect to θ is shown by cross-hatching in Fig. 1 in the Enclosure. The formulas used to find the upper and lower estimates of the maximum pressure for equilibrium of the shell are, respectively:

$$p^* = \frac{\sigma_0}{\beta}\left[1 + \frac{1}{2}\pi\alpha + \frac{1}{4\beta} + \frac{\sqrt{2}}{5}\frac{\alpha}{\beta^{3/2}}\right]\left[1 + \frac{\pi\alpha}{4}\right]^{-1} \qquad (2.12)$$

and

$$\sigma_1 = \frac{p\beta}{2}\frac{2 + \alpha\sin\theta}{1 + \alpha\sin\theta}, \qquad \sigma_2 = \frac{p\beta}{2}\ (\sigma_1 > \sigma_2) \qquad (2.14)$$

When the rigid-plastic material of the shell flows under maximum induced stress, the corresponding formulas for upper and lower estimates of the maximum pressure are, respectively

$$p^* = \frac{\sigma_0}{\beta}\frac{4/3 + 1/2\pi\alpha}{1 + 1/4\pi\alpha} \qquad (3.14)$$

$$p_0 = \frac{\sigma_0}{\beta}\frac{4/3 + 4/3\alpha}{1 + 1/3\alpha} \qquad (3.15)$$

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ACCESSION NR: AP3003460

For materials not sensitive to mean stress, the following equations are used to determine the upper and lower estimates of maximum pressure:

$$p^0 = \frac{\sigma_0}{\beta}\frac{\sqrt{6}+\frac{1}{3}\pi\alpha}{1+\frac{1}{6}\pi\alpha} \qquad (4.1)$$

and

$$p_0 = \frac{2}{\sqrt{3}}\frac{\sigma_0}{\beta}\frac{1+\alpha}{\sqrt{1+\alpha+\frac{1}{3}\alpha^2}} \qquad (4.2)$$

Orig. art. has 2 figures and 38 formulas.

ASSOCIATION: none

SUBMITTED: 05Feb63 DATE ACQ: 24Jul63 ENCL: 001

SUB CODE: AP NO REF SOV: 003 OTHER: 000

Card 3/4

LISTROVA, Yu.P. (Voronezh); RUDIS, M.A. (Voronezh)

Limit equilibrium of a toroidal shell. Izv.AN SSSR.Otd.tekh.nauk.-Mekh.i mashinostr. no.3:119-123 My-Je '63. (MIRA 16:8)
(Elastic plates and shells)

POLYAKOV, L.I. (Voronezh); POLYAKOV, Yu.T. (Voronezh); RUDIS, M.A. (Voronezh)

Carrying capacity of a two-layer circular plate. Izv.AN SSSR.Otd.tekh. nauk.Mekh.i mashinostr. no.6:163-165 N-D '62. (MIRA 15:12)
(Elastic plates and shells)

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E199/E442

10.6100

AUTHORS: Polyakov, L.I., Polyakov, Yu.T., Rudis, M.A. (Voronezh)

TITLE: The bearing capacity of a two-layer plate

PERIODICAL: Akademiya nauk SSSR. Izvestiya. Otdeleniye tekhnicheskikh nauk. Mekhanika i mashinostroyeniye, no.6, 1962, 163-165

TEXT: The plate under consideration consists of two layers of material with respective thicknesses h_1 and h_2, separated by a distance δ. The materials are connected by rigid point connections which do not cause any forces in the plane of the plate. The two layers have different yield values σ_1 and σ_2; the materials are assumed to be rigid-plastic and to be subject to the Tresca yield condition. The plate is loaded with a uniform pressure and the problem is to find the limiting pressure at which the plate begins to distort. A formula is quoted for this pressure on a plate with freely supported edges. A plate containing holes distributed in concentric circles is also considered and, using an energy method, formulae are derived for the limiting

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RUDIS, M.A., kand.tekhn.nauk

Designing the wall of a st... turbine housing. Teploenergetika 8 no.6:92-93 Je '61. (MIRA 14:10)
(Steam turbines)

RUDIS, M.A., kand.tekhn.nauk

Calculation of a tubular expansion piece. Energomashinostroenie 7 no.7:42-44 Jl '61. (MIRA 14:8)
(Gas turbines--Equipment and supplies)
(Expansion(Heat))